

## Cell adhesion and proliferation modulating properties of fluorgraphene

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Fluorgraphene (FG) is two dimensional carbon layer with  $sp^3$  hybridized carbon, where each carbon is bounded to a fluorine atom [1]. Fluorgraphene is a promising material for application in study of biological cells. It was found that fluorgraphene promotes differentiation of mesenchymal stem cells, including neuro-inductive effect via spontaneous cell polarization and promotion of cell adhesion and proliferation [2].

In our research, adhesion, proliferation rate and changes in morphology of bone marrow derived mesenchymal stem cells and osteoblasts MG-63 vs particular fluorgraphene substrate properties (size, shape, thickness, roughness, density per unit area of fluorgraphene flakes) were analysed. For fluorgraphene substrate preparation, fluorgraphene was chemically exfoliated in different organic solvents and spin-coated over glass substrates. This method allowed to obtain stoichiometrically equal fluorgraphene flakes. The obtained fluorgraphene samples were characterized by scanning, transmission electron microscopy, atomic force microscopy, UV – Vis and Raman spectroscopy. Adhesion, proliferation rate and changes in morphology were analyzed using IncuCyte Zoom real time cell monitoring system. Additionally cytoskeletal structures and cell differentiation markers were visualized immunocytochemically.

### References

1. T. J. Robinson, S. J. Burgess, E. C. Junkermeier, C. S. Badescu, L. T. Reinecke, K. F. Perkins, M. K. Zalalutdniov, W. J. Baldwin, J. C. Culbertson, P. E. Sheehan, E. S. Snow, Nano Lett. **10** (8), 3001 (2010)
2. W. Wei, T. Jacob, Physical review B **87**, 115431 (2013)

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